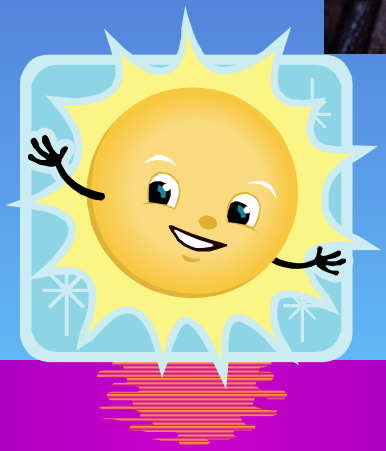
Heat Injuries

Covering one of the Most Serious Hazards of the Summer Months

HEAT INJURIES

- PREVENTION
- RECOGNITION
- TREATMENT
- REPORTING



Heat Hazards of Summer

- Sun exposure
- Heat related illnesses
- Fatigue and Exhaustion
- Dehydration

The Rising Temperatures

- As temperatures rise, so does the stress on your body.
- Two critical actions can help you battle the heat.
  - Acclimation to the heat.
  - Consumption of water.
- These two actions can help the most.

Your Body is a Good Regulator of Heat

- Your body reacts to heat by circulating blood and raising your skin's temperature. The excess heat is then released through the skin by sweating.
- Physical activity can limit the amount of blood that flows to the skin to release heat.

Your Body is a Good Regulator of Heat

- Sweating can also maintain a stable body temperature if the humidity level is low enough to permit evaporation and if the fluids and salts you lose are adequately replaced.
- When your body cannot release heat, it stores it. This raises your core temperature and heart rate putting your health at risk.

Interfering with the Regulator

- Many factors can cause imbalances in your body's ability to handle heat.
  - Age
  - Weight
  - Fitness
  - Medical condition
  - Diet

PREVENTION

- **Students:**

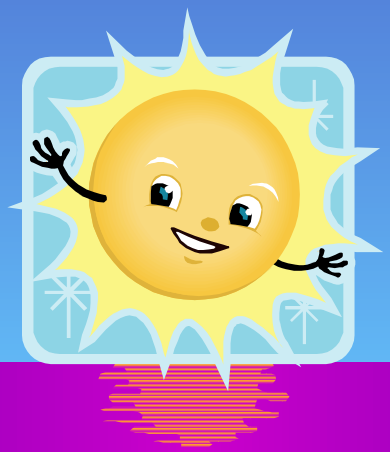
  - All soldiers will receive a mandatory briefing or class on prevention of heat injuries as part of in-processing.

- **Cadre:**

  - Cadre members will have the pocket-sized graphic training aid (GTA) 5-8-12, with them during training.

Summer Heat

- Heat stress is a serious hazard in the workplace as well as at home.
- Excessive heat can place an abnormal stress on your body.
- When your body temperature rises even a few degrees above normal (which is about 98.6 degrees Fahrenheit) you can experience
  - muscle cramps
  - become weak
  - disoriented
  - dangerously ill



Six Factors of Heat Stress

- Temperature
- Humidity
- Movement of Air or lack of air movement
- The radiant temperature of the surroundings
- Clothing
- Physical activity

PREVENTION

- **Individual Soldier Risk Factors:**
  - Previous heat injury
  - Not acclimated
  - Not fit (2 miles > 16 minutes)
  - Large body mass
  - Minor illnesses (colds, skin problems, etc.)
  - Medications (prescription & OTC)
  - Diet & Hydration (alcohol & supplements)
  - Highly motivated

Heat Stress-Early Sign of Trouble

- Heat Stress will reduce your work capacity and efficiency.
- Signs of heat stress include:
  - Tiredness
  - Irritability
  - Inattention
  - Muscular cramps.

Heat Stress-Early Sign of Trouble (Cont.)

- **If you are:**
  - **Overweight**
  - **Physically unfit**
  - **Suffer from heart conditions**
  - **Drink too much alcohol or smoke**
  - **Are not use to summer temperatures or humidity**
- **You may be at greater risk of heat stress and should seek and follow medical advice.**

Heat Rash- Another Early Sign of Trouble

- Also known as prickly heat, occurs when people are constantly exposed to hot and humid air, causing a rash that can substantially reduce the ability to sweat.
- Heat rash is not just a nuisance because of discomfort, but by reducing the ability to sweat, the ability to tolerate heat is reduced.

Heat Rash and Heat Stress

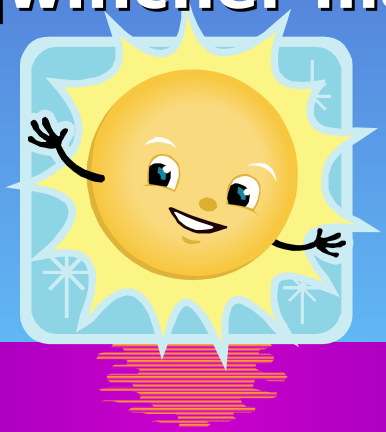
- First Aid for Heat Rash
  - Cleanse the affected area thoroughly and dry completely.
  - Calamine or other soothing lotion may help relieve the discomfort.
- First Aid for Heat Stress
  - Good nutrition
  - Become Heat acclimated
  - Drink lots of appropriate fluids

Heat Cramps- Final Warning

- May occur after prolonged exposure to heat.
- They are the painful intermittent spasms of the abdomen and other voluntary muscles.
- Heat Cramps usually occur after heavy sweating and may begin towards the end of the workday.

Heat Cramps- First Aid

- First aid for heat cramps will vary. The best care is:
  - Rest
  - Move to a cool environment
  - Drink plenty of water- **No pop, sparkling water, or Alcohol.**
  - Electrolyte fluids such as Gatorade or Sqwincher may also be used.

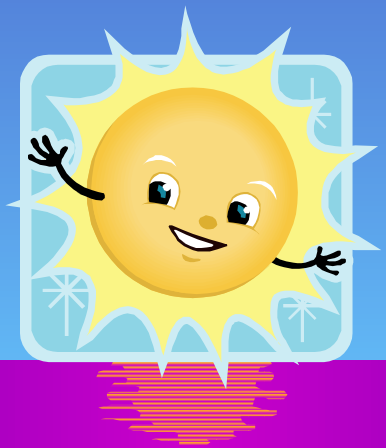


RECOGNITION

- **Heat exhaustion**
  - Most common form
  - Excessive cardiovascular demand & water- electrolyte depletion
  - No organ damage
  - Treat immediately to prevent progression to heat stroke
  - Treat as heat stroke if altered mental status, or mild symptoms do not improve

PREVENTION

- **Heat Injury Variables:**
  - **The Climate (temperature & humidity)**
  - **Intensity of Activity**
  - **Individual Soldier Risk Factors**



Heat Exhaustion- Time Running Out

- May result from physical exertion in hot environments.
- Symptoms may include:
  - Profuse sweating
  - Weakness
  - Paleness of the skin
  - Rapid pulse
  - Dizziness
  - Nausea
  - Headache
  - Vomiting
  - Unconsciousness.
- The skin is cool and clammy with sweat. Body temperature may be normal or subnormal.

Heat Exhaustion- What Happened

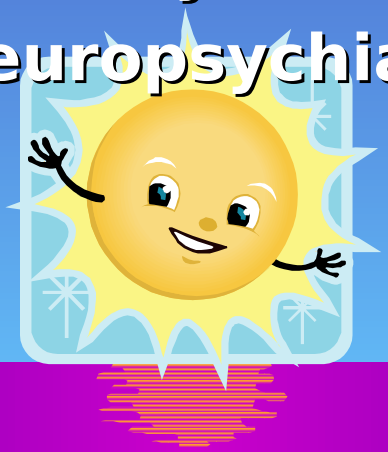
- Heat exhaustion develops when a person fails to replace fluids and salt that are lost through sweating.
- You may start to experience extreme weakness, fatigue, giddiness, nausea or a headache as heat exhaustion progresses.

Heat Exhaustion- First Aid

- Rest in the shade or cool place.
- Drink plenty of water (preferred) or electrolyte fluids.
- Loosen clothing to allow for your body to cool.
- Use cool wet rags to aid cooling.

RECOGNITION

- **Heat stroke - EHI**
  - **- “Catastrophic medical emergency”**
  - **- “Most common in the military and athletes”**
  - **- Core body temperature >104ºF**
  - **- Central nervous system dysfunction**
  - **- “Profound neuropsychiatric impairment”**



Heat Stroke- Your Out of Time

- This is a serious medical condition that urgently requires medical attention.
- Sweating is diminished or absent, which makes the skin hot and dry.
- Body temperature is very high (106 degrees F. and **rising**).

Heat Stroke- Signs and Symptoms

- Mental confusion
- Delirium
- Chills
- Dizziness
- Loss of consciousness

- Convulsions or coma
- A body temperature of 105 degrees F or higher
- Hot, dry skin that may be red, mottled or bluish
- A strong fast pulse.

Heat Stroke- Rapid Response

- If you suspect someone is suffering from heat stroke, call an ambulance immediately.
- Their condition will rapidly deteriorate.
- You must make a provide care immediately.

Heat Stroke- First Aid

- **This is a Medical Emergency!!**
- **Brain damage and death are possible.**
- **Until medical help arrives, move the victim from the heat and into a cool place.**

For all heat injuries call:

9-1-1

Heat Stroke- First Aid

- You must use extreme caution when soaking clothing or applying water to a victim. Shock may occur if done to quickly or with too cool of water
- Soak his or her clothes with water and use a fan or ice packs.
- Douse the body continuously with a cool liquid and summon medical aid immediately.

PREVENTION

- **Command Responsibilities:**
  - **WBGT hourly in vicinity of training**
  - **Enforce water intake and work/rest cycles**
  - **Modify intensity and uniform**
  - **Plan for sequential days of high activity**
  - **Acclimate soldiers**
  - **Hydrate the day before training**
  - **Eat 3 squares/day, no supplements**

PREVENTION

- **Command Responsibilities:**
  - Plan for & accommodate the unusual
  - Machinery rooms
  - "Buttoned up" in a combat vehicle
  - MOPP/NBC operations & Body armor
  - Welding & heat treating
  - Commercial personal protective equipment
  - Camouflage & protection from insects
  - Firefighting

PREVENTION

- **Individual Soldier Responsibilities:**
  - Learn early signs & symptoms of heat injury
  - Drink enough to stay hydrated
  - Deploy with head cover, sunglasses, sunscreen, lip balm, & skin care products
  - Attend training & carry GTA
  - Use the buddy system to monitor for symptoms

RECOGNITION

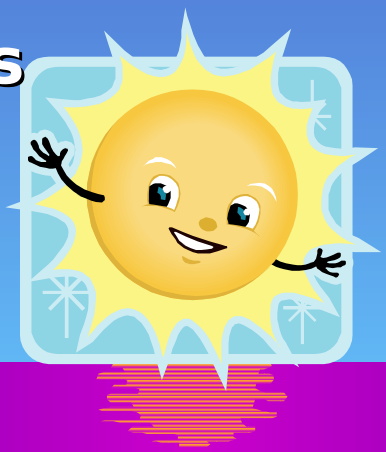
- Environmental Conditions:
  - WBGT (Wet Bulb vs. Heat Index)
  - Successive days of heat/humidity
- Heat injuries often occur in groups
- Heat injuries begin/occur in the morning

Air quality? (USMA study)

RECOGNITION

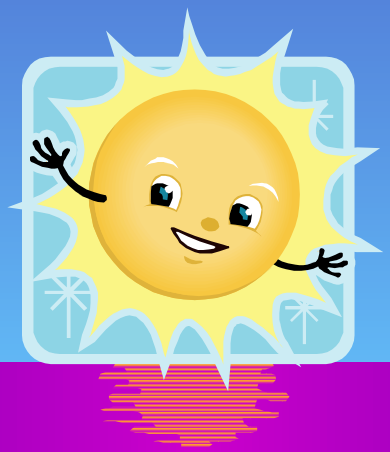
WET BULB (WBGT)

- Measure of heat stress
- Factors temperature, humidity, wind
- Begin monitoring at 75º F
- Record hourly
- Report changes to subordinates
- Five categories



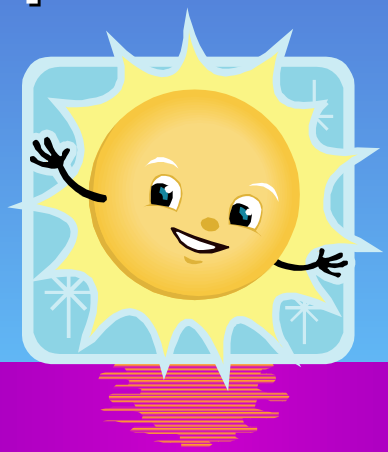
RECOGNITION

- **Heat injury symptoms**
  - **Core body temperature**
  - **Urine color and volume**
  - **Mental status**



RECOGNITION

- **Minor heat injuries/illnesses:**
  - **Heat edema**
  - **Miliaria rubra (prickly heat/heat rash)**
  - **Sunburn**
  - **Heat tetany**
  - **Parade syncope**
  - **Heat cramps**



Work/Rest and Water Consumption Table

Applies to average sized, heat-acclimated soldier wearing BDU, hot weather. (See TB MED 507 for further guidance.)

Easy Work	Moderate Work	Hard Work
• Weapon Maintenance • Walking Hard Surface at 2.5 mph, < 30 lb Load • Marksmanship Training • Drill and Ceremony • Manual of Arms	• Walking Loose Sand at 2.5 mph, No Load • Walking Hard Surface at 3.5 mph, < 40 lb Load • Calisthenics • Patrolling • Individual Movement Techniques, i.e., Low Crawl or High Crawl • Defensive Position Construction	• Walking Hard Surface at 3.5 mph, ≥ 40 lb Load • Walking Loose Sand at 2.5 mph with Load • Field Assaults

Heat Category	WBGT Index, F°	Easy Work		Moderate Work		Hard Work	
		Work/Rest (min)	*Water Intake (qt/hr)*	*Work/Rest (min)*	*Water Intake (qt/hr)*	*Work/Rest (min)*	*Water Intake (qt/hr)*
1	78° - 81.9°	NL	½	NL	¾	40/20 min	¾
2 (GREEN)	82° - 84.9°	NL	½	50/10 min	¾	30/30 min	1
3 (YELLOW)	85° - 87.9°	NL	¾	40/20 min	¾	30/30 min	1
4 (RED)	88° - 89.9°	NL	¾	30/30 min	¾	20/40 min	1
5 (BLACK)	> 90°	50/10 min	1	20/40 min	1	10/50 min	1

- The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hrs of work in the specified heat category. Fluid needs can vary based on individual differences (± ¼ qt/hr) and exposure to full sun or full shade (± ¼ qt/hr).
- **NL** = no limit to work time per hr.
- **Rest** = minimal physical activity (sitting or standing) accomplished in shade if possible.
- ***CAUTION: Hourly fluid intake should not exceed 1½ qts.***

  Daily fluid intake should not exceed 12 qts.
- If wearing body armor, add **5°F** to WBGT index in humid climates.
- If doing Easy Work and wearing NBC (MOPP 4) clothing, add **10°F** to WBGT index.
- If doing Moderate or Hard Work and wearing NBC (MOPP 4) clothing, add **20°F** to WBGT index.

For additional copies, contact: U.S. Army Center for Health Promotion and Preventive Medicine Health Information Operations Division at (800) 222-9698 or CHPPM - Health Information Operations@apg.amedd.army. mil.
For electronic versions, see http://chppm-www.apgea.army.mil/heat. Local reproduction is authorized.
June 2004

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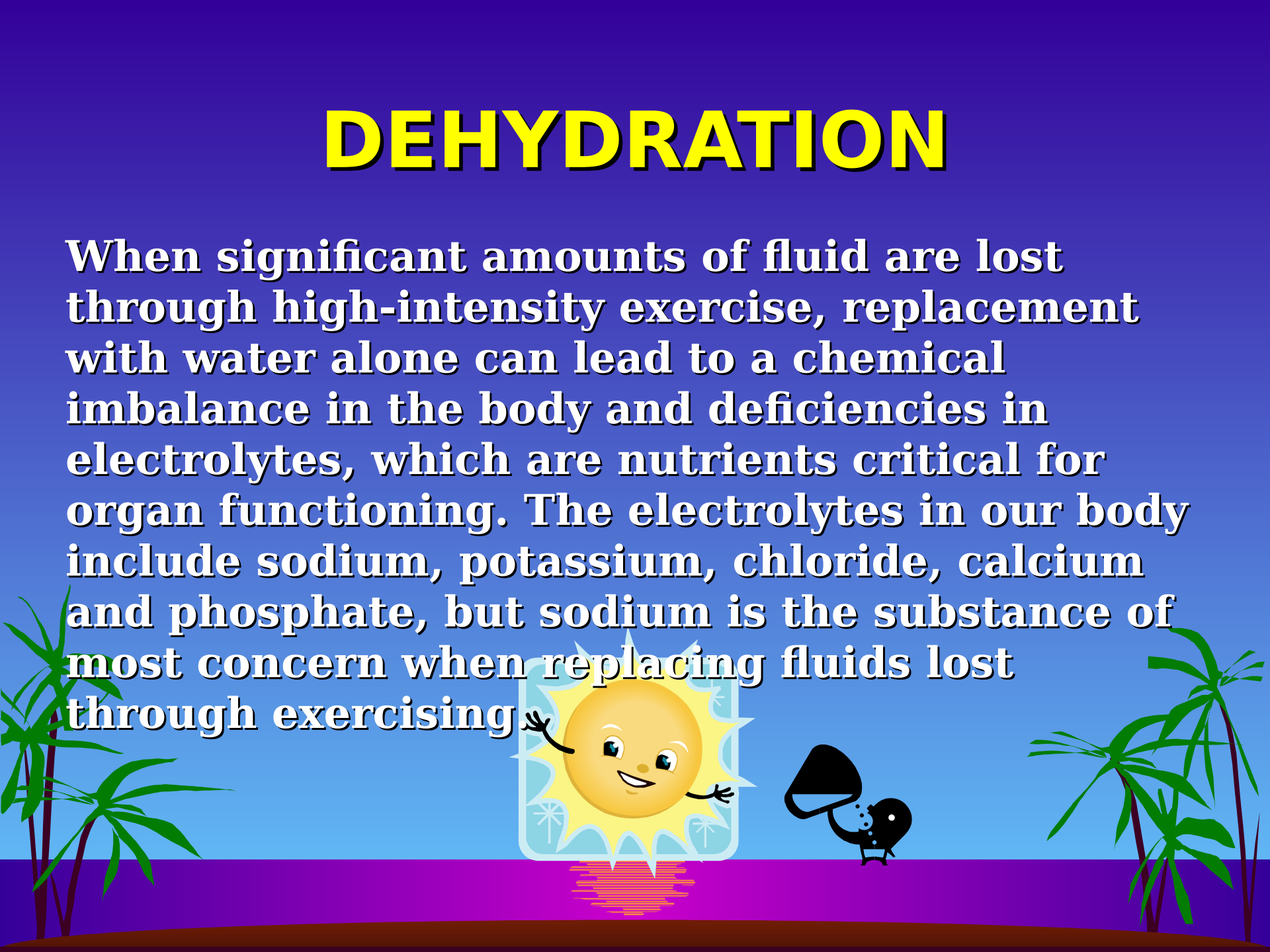
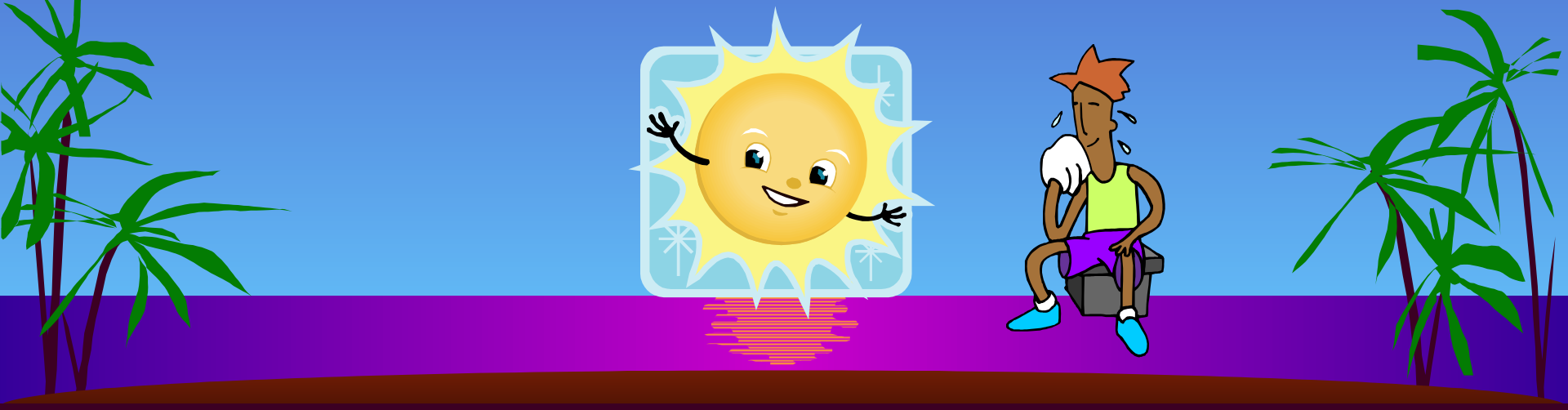
DEHYDRATION

When significant amounts of fluid are lost through high-intensity exercise, replacement with water alone can lead to a chemical imbalance in the body and deficiencies in electrolytes, which are nutrients critical for organ functioning. The electrolytes in our body include sodium, potassium, chloride, calcium and phosphate, but sodium is the substance of most concern when replacing fluids lost through exercising.



What is Dehydration?

Dehydration can be defined as "the excessive loss of water from the body." Diseases of the gastrointestinal tract can lead to dehydration in various ways. Often, dehydration becomes the major problem in an otherwise self-limited illness. Fluid loss may even be severe enough to become life-threatening.



What is Dehydration?

Cont.

Our bodies require a certain amount of fluid intake on a daily basis to function; the minimum is about equal to four 8 ounce glasses (one liter or one quart). Requirements vary with activity and age, but most active persons need two to three times this basic amount. Basic fluid intake serves to replace the fluids which are required to perform our normal bodily functions. If we take in less or lose mo fluid than is needed, the end result is dehydration.

What causes Dehydration?

A decrease in oral liquid intake may be due to nausea or loss of appetite; this may be worsened by an inability to keep things down (vomiting). Medications also can cause an increased fluid loss. Prior bowel resection or ileostomy can make a person more susceptible to dehydration.

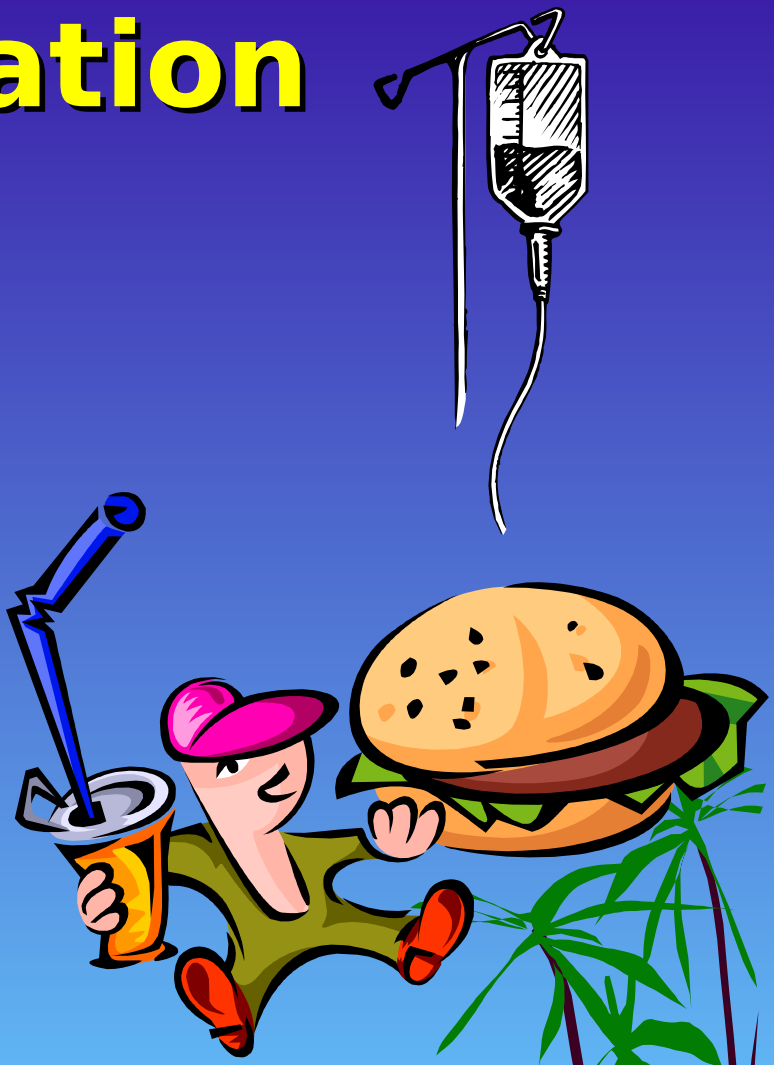
Symptoms of Dehydration

Reliable clues to indicate dehydration is rapid drop in weight, increasing thirst, dry mouth, weakness or lightheadedness (particularly if worsening on standing), darkening of the urine, or a decrease in urination. Severe dehydration can lead to changes in the body's chemistry, kidney failure, and can even

Treatment/Prevention of Dehydration

- The best way to treat dehydration is to prevent it from occurring. If you suspect excessive fluid loss during and illness, your physician should be notified. Intravenous or oral fluid replacement may be needed, depending on severity of fluid loss.

- Food intake should be continued if at all possible, except for high fiber fruits



PREVENTION

- **Hydration**
  - **What you drink and how you drink it**
  - **Dehydration degrades performance (-4% = 50% loss)**
  - **1% dehydration increases core body temperature by .21° - .49ºF**

Example

4% dehydration =

100.6ºF body temperature 4 x .

49 + 98.6 = 100.6°F

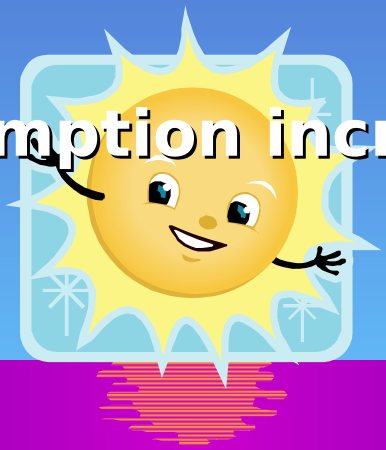
RECOGNITION

- **Hyponatremia: Water intoxication**

The flip side of dehydration is overhydration — or simply, drinking too much water too quickly. When sodium is lost through sweating and water is drunk as the replacement fluid over a period of hours, the sodium left in the blood can become diluted. This can cause a condition called "hyponatremia," which can lead to damage in certain kinds of tissues in the body. Changes are most noticeable in the nervous system where seizures, coma, and even death can occur. Recognizing overhydration or hyponatremia is challenging because the symptoms may resemble those of heat stroke or heat exhaustion. Early symptoms can include confusion, nausea, fatigue, muscle cramps, and weakness. More serious symptoms include vomiting, muscle twitching, delirium, seizures, and coma. The main difference between heat stroke and heat exhaustion, when compared to overhydration, is that overhydration doesn't cause the victim's temperature to rise. Because overhydration can be

PREVENTION

- **Heat Acclimation:**
  - **Allow two weeks**
  - **Retained for 1 week, lost in 3 weeks**
  - **Minimum of 2 hrs/day of cardiovascular exercise, not strength training**
  - **Most at risk: least fit and most motivated**
  - **Water consumption increases**



PREVENTION

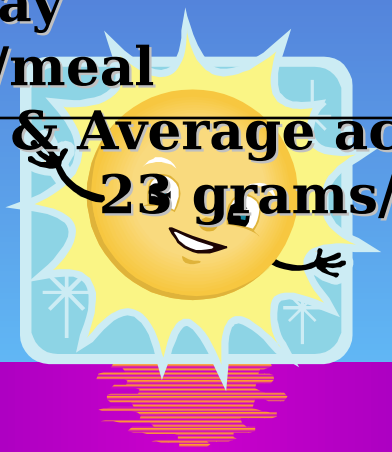
- **Electrolyte (Salt) replacement:**
  - **Lost in sweat**
    - **Consumption of complete MRE is adequate**
    - **Salt food to taste**
    - **Carbohydrate/electrolyte drinks**
    - **Do not use salt tablets**

Sodium content

Mess hall food = 2.3 – 9.5 grams/day

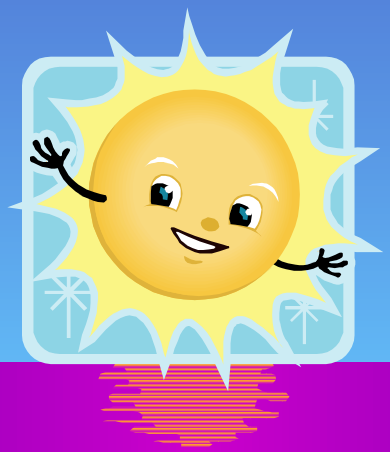
One MRE = 3.6 grams/meal

High heat & Average activity requires 10 – 23 grams/day



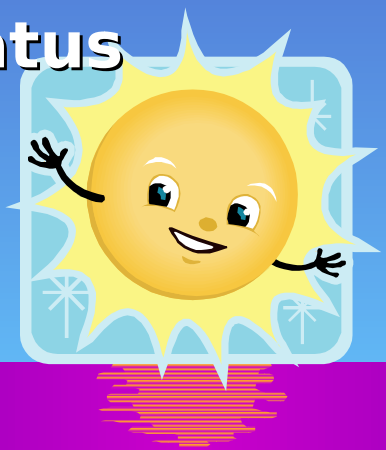
TREATMENT

- Review treatment and evacuation plans
  - Combat Lifesavers and CPR/AED
  - Transport time to definitive medical care
- Provide fluids (by mouth or IV) & cooling
- Distinguish between types of heat injury
- Heat stroke:
  - Life threatening
  - Call 911



TREATMENT

- **Heat Exhaustion:**
  - Rest
  - Cooling – reduce to 101ºF
  - Rehydration
  - Evacuate if symptoms don't improve, or change in mental status
  - Call 911



HEAT INJURY
PREVENTION & TREATMENT

Questions?

- References:

- TB Med 507, Heat Stress Control and Heat Casualty Management

- TRADOC REG 350-6, Enlisted Initial Entry Training (IET) Policies and Administration

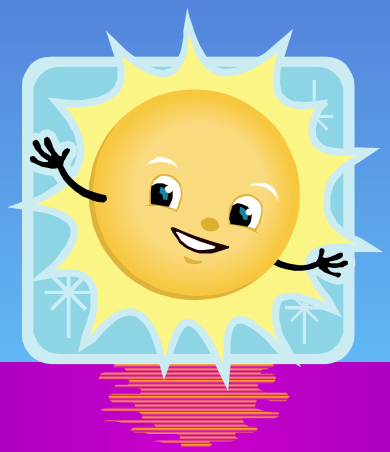
- The Surgeon General, 3 June 2002 & March 2003

- http://safety.army.mil

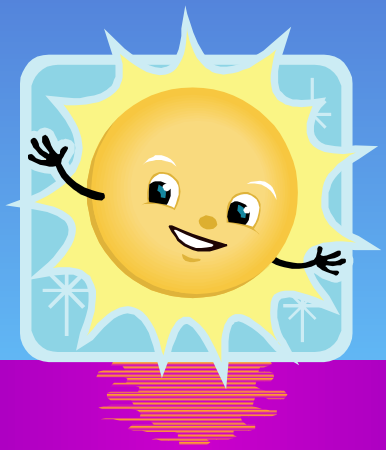
- http://usachppm.apgea.army.mil/heat

REPORTING

- Emergency Medical Service
- Chain-of-Command
- DA Form 285, Ground Accident Report

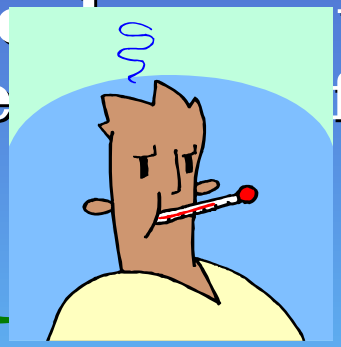


SUNBURN



SUNBURN Cont.

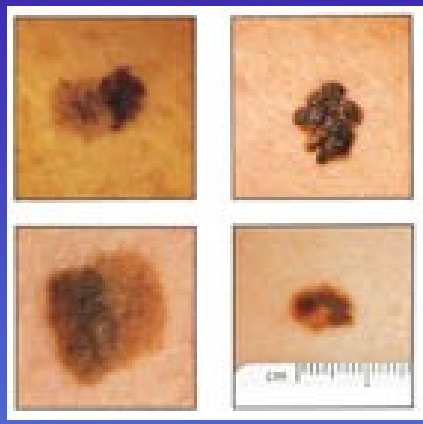
Sunburn is the result of not using proper skin protection while sunbathing or even from routine sun exposure. The skin becomes red, tender and swollen. You may have a stinging sensation and blistering may occur. Some people even get a low grade fever. The skin will eventually shed or p the skin underneath is rene f.

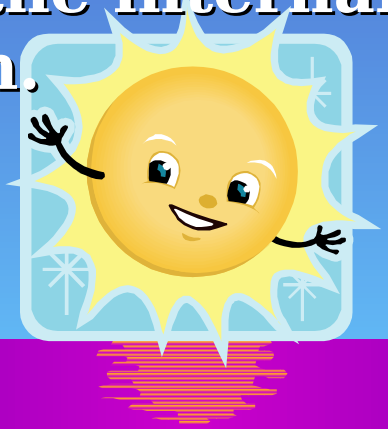


Without Proper Skin Protection……

These are the Side Effects

- Excessive exposure to sunlight will cause irreversible skin damage.
- People who get sunburn have an increased risk of developing melanoma skin cancer.
- Each new sun burn increases the risk a little more.
- Melanoma skin cancer is very dangerous because it can spread quickly, affecting the internal organs and result in death.

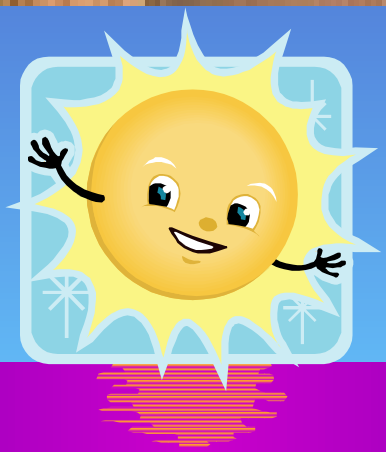




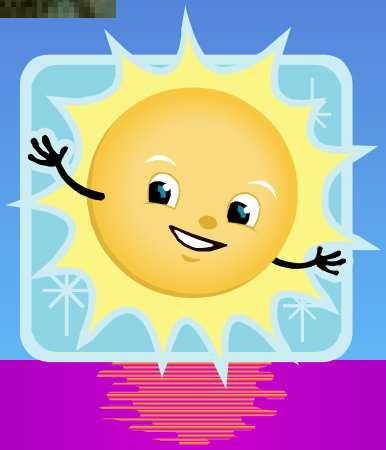
Melanoma

- Skin cancer can be thought of as an outdoor leisure/exercise/work syndrome, the result of periods of intense overexposure to ultraviolet light even if the ozone was not depleted. An estimated 32,000 U.S. citizens will be told they have melanoma this year, and between 7,000 and 9,000 will die when the cancer metastasizes (spreads) to vital organs. That's a 300-percent rise in the last decade.
- If caught early, malignant melanoma is virtually 100-percent curable. Physicians recommend a monthly skin check for the symptomatic ABCD's of skin cancer.

Melanoma



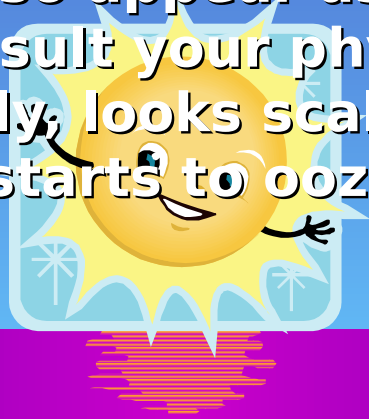
Squamas Cell



Basal Cell

ABCD

- **A for Asymmetry :** This is when one half of a mole or skin spot doesn't match the other half.
- **B for Border Irregularity :** A mole or skin spot with ragged, notched or blurred edges.
- **C for Color :** Any spot or mole that changes in color from black to brown to red, often with a combination of colors. Blue and white may appear.
- **D for Diameter :** Any mole or spot that grows to more than a quarter inch; about the size of the end of a pencil eraser.
- About one-half of all melanomas arise from an existing mole, but they can also appear as a completely new spot on the skin. Consult your physician if any mole or spot appears suddenly, looks scaly, becomes itchy, painful or tender, or starts to ooze blood.



Prevention-Treatment

- Cold creams and moisturizers will help reduce the pain associated with sunburn.
- Sun damage is permanent and irreversible. You should put on sun-screen or moisturizer, and lip balm with an SPF of 15 or higher everyday before leaving the house. Don't go overboard and try to avoid the sun completely.
- Sun exposure and sunbathing produce gradual skin damage even if sunburn is avoided. Two to forty years can pass between the time of sun exposure and the time the skin shows signs of sun damage.

Questions?